

SAN ANTONIO BRAC 2005 GROWTH MANAGEMENT PLAN

TASK 3 REPORT

TRANSPORTATION INFRASTRUCTURE

**PREPARED FOR
CITY OF SAN ANTONIO
OFFICE OF MILITARY AFFAIRS**

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TRANSPORTATION ELEMENT OF THE SAN ANTONIO GROWTH MANAGEMENT PLAN

1.0 INTRODUCTION

The San Antonio BRAC 2005 Growth Management Plan addresses a population of approximately 12,000 persons being relocated to the post as a result of the 2006 Base Realignment and Closure Commission (BRAC) decisions and related changes. In addition, it considers: (1) Actions needed by the City of San Antonio or others to assist with the BRAC implementation; (2) The possibility of leveraging BRAC to achieve additional economic growth; and, (3) The possibility of leveraging BRAC to stimulate revitalization of the communities around the post. There are separate reports which address transportation, community growth and revitalization and health related aspects of the BRAC activity. This report considers the traffic and transportation aspects of BRAC, economic growth and community revitalization.

An adequate transportation network is an integral part of the transportation management process for any urban development initiative. Urban life is enriched through widespread participation in numerous community opportunities. Transportation networks are the conduits that facilitate diverse community participation in areas ranging from employment and shopping, to cultural, recreational and educational opportunities. The success of communities around Fort Sam Houston will depend in to a significant degree on how well the transportation systems work to serve their needs.

This task report begins with an overview of principles that aid in the understanding of transportation systems and the impacts of land use decisions. The introductory section is followed by discussion of the proposed land uses around Fort Sam Houston that are part of the redevelopment initiative and their associated traffic impacts. It concludes with recommended network improvements required to provide accessibility and support community activities. This preliminary look at potential land uses and traffic impacts is only the beginning of an ongoing process to foster the goals of the growth management initiative. Thus, this chapter ends with recommended next steps to support the implementation process.

1.1 STUDY AREA

The transportation system evaluation process focuses on the street and highway system within and surrounding Fort Sam Houston, and generally includes roads carrying more than 5,000 vehicles per day, with other select corridors included for continuity. Though the Growth Management Plan land use recommendations extend little more than two miles from the perimeter of Fort Sam Houston, the transportation system serving the area extends throughout the metropolitan area. Major streets and freeways included in this preliminary evaluation extend from IH-410 on the north to IH-

10 on the south and from US 281 on the west to east of IH-35/IH-410 East, but impacts to and recommendations for other freeways are also mentioned.

1.2 TRANSPORTATION SYSTEMS PLANNING

Transportation systems planning is the quantitative science of determining the configuration and size of transportation networks necessary to accommodate a given arrangement of land uses. As an analogy, transportation system planning is like the development of a grid of beams, rafters and stringers that hold up a back yard recreational deck. (Rafters run between beams, and stringers are smaller cross beams that only run between rafters.) Objects that are placed on the deck; like people, furniture, potted plants, etc; dictate the arrangement and size of beams, rafters and stringers that are needed to support the deck. If this support system is not strong enough, heavier objects may collapse through the deck planks and fall to the ground below.

Transportation grids work in a similar fashion. Beams are like highways, rafters like major streets, and stringers like minor streets that support the deck above. From a capacity perspective, the “freeway beams” are the thickest and strongest and can accommodate over 25,000 trips per lane per day. The “major street rafters” accommodate around 10,000 vehicle trips per lane per day, and “minor street stringers” handle around 5,000 per lane per day.

The weight of objects on the deck is analogous to the traffic generation intensity of land uses that are placed on the deck. A real recreational deck might be designed to handle a uniform load of 80 to 100 pounds per square foot. Clearly, no one expects to have someone place a pallet of bricks on a recreational deck, which could easily amount to over 1,000 pounds per square foot. What is not often understood is that the intensity of traffic generated by different land uses varies considerably from less than 10 trips per acre for parks and homes on acre lots to over 10,000 trips per acre for high rise office buildings. Thus, a small amount of commercial development can do a lot of damage to surrounding traffic conditions, much like the bricks on the deck. Most commercial shopping centers generate traffic in the range of 500 to 3,000 trips per acre. Industrial uses normally generate 100 to 500 trips per acre. Typical residential uses range from 10 to 50 trips per acre for single family homes to 50 to 150 trips per acre for duplexes, townhomes, and apartment complexes.

Another important principle is that residential land uses spread their traffic generating loads thinly and evenly whereas commercial developments concentrate their traffic loads, much like the aforementioned stack of bricks. This explains why a weak road grid rarely results in abandoned housing due to traffic congestion alone, and why large commercial building projects must be located adjacent to one or more major streets and highways (stronger beams) to provide the necessary traffic access. Commercial development generates traffic with such high intensity that it becomes vulnerable to road grid weaknesses. Like heavy weights on a weak deck, intense development can “fall through” the deck. Examples include vacant shopping centers and office buildings in areas with severe congestion. Deck collapse can also occur by “overbuilding” too many shopping centers or office buildings so that traffic exceeds the capacity of the

surrounding road grid. Yet another source of collapse is removal of the support structure. Clearly, for example, closure of the roadway to through-traffic at Fort Sam Houston has resulted in the demise of retail businesses south of Fort Sam Houston along New Braunfels Avenue.

As one final note, the intensity of development that a road grid can handle is also dependent on whether streets and highways connect together in a complete grid which allows full use of the “strength” or “capacity” of each roadway. Street networks that consist of disjointed roads and circuitous roads can not handle the intensity of development that a complete grid network would support. This is a significant issue with the road grid around Fort Sam Houston. Capacity of an incomplete road network is reduced because the strength of the network diminished by the weak or missing road segments.

2.0 TRANSPORTATION/LAND USE SYSTEM STRATEGIES

The decision to intensify the level of traffic generated by urban use of land must be coupled with a rational strategy to accommodate the added traffic load. Potential strategies include strengthening the transportation network, reducing the intensity of traffic loading, or redistributing the load to better match the strengths and weaknesses of the transportation grid.

Strategies that strengthen the grid include:

- Strengthen roadway junctions at intersections and interchanges by adding or lengthening turn lanes, or adding overpasses to at-grade intersections.
- Widen roads at bottlenecks to recover the unusable capacity of sections adjacent to the bottleneck.
- Connect broken segments of road to create contiguous longer routes.
- Widen roads over their full length between major loading points.
- Upgrade roads to a higher capacity classification (arterial to expressway or freeway).
- Connect or widen incomplete sections of other road classes.
- Build new roads on new alignments.

Strategies to reduce traffic loads break the expensive cycle of perpetual road expansion in developed urbanized areas. These strategies are listed below:

- Maintain Balance of Jobs to Housing - Since the entire Fort Sam Houston complex is a primary employer, there were many jobs in the project study prior to the BRAC program. However, most of these jobs were held by persons living outside the FSH redevelopment study area. This imbalance could increase as the result of BRAC-related expansion. For this reason, development of the surrounding area should encourage the type of expansion directly support the mission of the expanded post , and focus on providing affordable housing opportunities with supporting amenities for FSH employees and employees of support industries located within the FSH redevelopment study area.
- Encourage the existing commercial buildings by activities which support the post-missions. This strategy consists of providing a comprehensive array of services

that support the post mission rather than locating unrelated enterprises that would compete with the post for building space and transportation system capacity.

- Maintain Balance of Stores to Housing. Areas to the west of the post generally have adequate retail space with some available for renewal along Austin Highway (Loop 368). Infill retail development is also occurring along Broadway Street on the west side of the study area. Areas south and east of the post have a need for additional retail space.
- Maintain a Neighborhood Focus for Retail Development - Unnecessarily large concentrations of retail space such as big box centers, conventional apparel shopping malls, outlet centers, or super warehouse stores should be discouraged until household densities south of the post are sufficient to support such markets, and then the locations should be consistent with transportation system capacity.

Strategies to balance loads normally consist of balancing the spatial distribution of commercial uses and other highly-desirable land uses equally throughout the roadway grid. This distribution must consider both the configuration of the roadway grid, and the intensity of residential development throughout the area such that the local supply matches local demand. Examples of other desirable land uses could include amenities such as parks, libraries, colleges, good schools, as well as unique retail establishments and restaurants. As an example, franchised retail establishments usually distribute operations throughout a populated area so that goods and services are conveniently accessible.

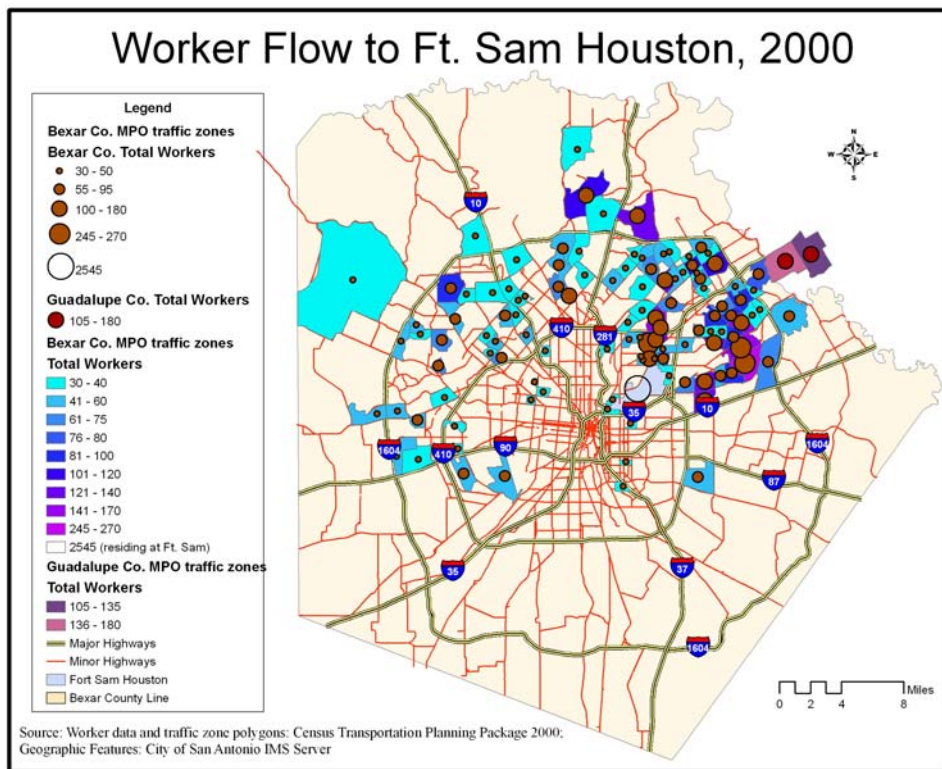
2.1 LOCATION OF OFF-SITE HOUSING

Part of the goal of this study is to help develop viable housing opportunities for post staff in areas surrounding the post. Even so, many new post staff members are expected to live outside the study area. Perhaps the best indicator of where they may live is the spatial distribution of the homes occupied by current post staff. Though no direct information regarding the place of residence of post employees was provided during this study, an estimate of the spatial distribution determined using the Journey to Work Survey database from the Year 2000 U.S. Census.

The map on the next page illustrates the locations that have the highest concentration of post employees on a regional basis. The map on the following page focuses on the northeastern portion of the city where the concentration of employees is highest.

The following points summarize key observations:

- The largest concentrations of FSH employees live north of the post.
- Most post employees live in the “half donut” bounded by Loop 1604 on the north, IH-410 north loop on the south, and from US 90 on the west around the north to IH-10 on the east.
- Very few employees live within the area outlined by IH-410.
- Very few post employees live in the south half of the San Antonio metropolitan area south IH-10 on the east and US 90 on the west.



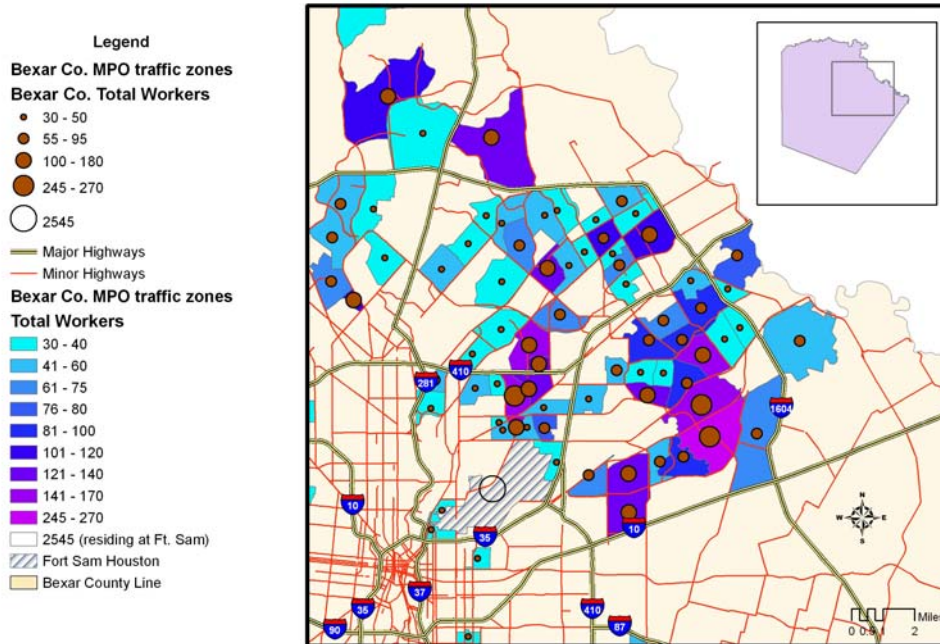
These findings reveal why both congestion and the list of transportation improvements from recent FSH transportation studies generally involve roads that access areas northwest, north and northeast of the post.

3.0 BRAC-RELATED DEVELOPMENT AT FORT SAM HOUSTON

Expansion of Fort Sam Houston due to the BRAC program is expected to increase the traffic generation of the main base from 51,000 trips per day as counted in 2007 to over 105,000 trips per day by 2012. In addition, expansion to the BAMC hospital campus will expand the traffic generation of the BAMC triangle from 18,000 trips per day in 2007 to 36,000 trips per day by 2012. Therefore, prior to any redevelopment of areas surrounding the post, an increase of 72,000 trips per day is expected to occur over the course of five years.

Separate traffic studies of Fort Sam Houston and of the BAMC Triangle have resulted in identification of numerous near term transportation system improvements required to address new traffic generated by expansion of each installation, as well as address the redistribution of traffic due to road closures, including the overall closure of internal post roadways to outside traffic due to security concerns. Though these studies generated lists of roadway network improvements needed on post and among arterial roadways adjacent to the post, no study had yet addressed the implications of post expansion on the San Antonio regional street and highway system.

Northeast Bexar Co. Worker Flow to Ft. Sam Houston



Source: Worker data and traffic analysis zone polygons: Census Transportation Planning Package (CTPP) 2000.
Geographic features: City of San Antonio IMS Server.

4.0 REDEVELOPMENT AROUND FORT SAM HOUSTON

An assessment of redevelopment opportunities within the project study area was conducted by Dixie Watkins III & Associates. The goal of this assessment was to identify the highest and best use of parcels of land that were either undeveloped, underdeveloped, or in need of renewal or rehabilitation due to the condition of current buildings.

Though each land owner hopes that their land can be sold at maximum profit or developed to achieve the “highest and best use”, the reality is that the interaction of the transportation system and the surrounding market of “consumers” limit the amount of land that can be marketed in the lucrative “commercial” category. Due to the intensity of traffic generation from commercial development, it takes only a limited number of dense commercial developments to overwhelm surrounding streets and highways. As discussed in previous sections of this report, commercial uses must remain in balance with other uses to make the best use of transportation infrastructure and minimize regional congestion.

The amount of traffic generated by a proposed land use is estimated using data from a compendium of statistical research on traffic generation of different types of buildings. These statistics are compiled in a document called the “Trip Generation Manual” published and updated by the *Institute of Transportation Engineers*. Traffic generation

is estimated using rates related to the quantity of development. Residential traffic is estimated on a “per dwelling unit” basis while most commercial and industrial traffic is estimated based on square feet of building space.

Pending the assessment of the highest and best use of parcels in the FSH revitalization study area, the gross trip generation of all new development was estimated at 560,000 trips per day. This estimate was considered to be a “build-out” projection. A subset of this development plan was derived from the build out plan to represent a near term redevelopment forecast expected to occur over the next 10 years. This development projection produces a total of 300,000 trips per day. The figure on the following page illustrates the spatial distribution of these redevelopment parcels around Fort Sam Houston. Parcel information boxes highlighted in yellow are for Fort Sam Houston and the San Antonio Military Medical Center North campus or the “BAMC Triangle”. Those highlighted in green are uses expected to occur over the next 10 years. Those in white boxes are long term redevelopments beyond 10 years in the future.

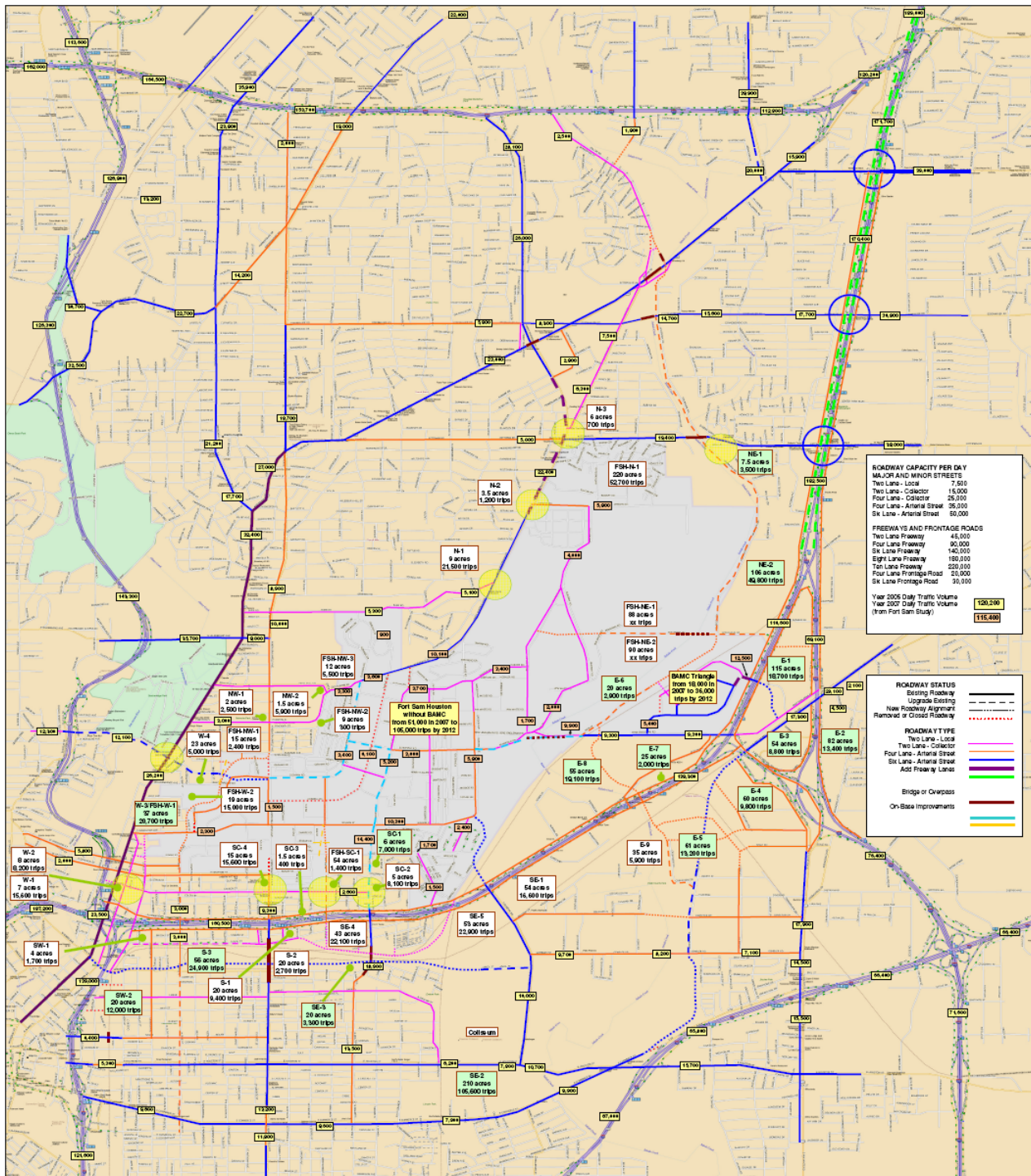
Key findings from this evaluation were that the highest and best use approach produced levels of commercial real estate traffic drastically greater than that of new residential development by a ratio of six or eight to one. This was true of both the build-out forecast, and the near term development plan. Though some demand for commercial development could be absorbed by existing housing due to rising incomes or diversion from other areas, the ratio is still large enough to require a significant expansion of regional transportation system capacity to make these commercial developments viable.

5.0 REGIONAL TRANSPORTATION NETWORK IMPROVEMENTS

This section discusses regional transportation improvements recommended for different timeframes to support BRAC-related expansion at Fort Sam Houston and other development initiatives associated with the growth management plan.

5.1 PREVIOUS BRAC-SUPPORTING IMPROVEMENTS

Some BRAC-supporting roadway improvement projects planned prior to the BRAC announcement in 2005 are already under construction or completed. Examples include major expansion to IH-410 north from six to ten lanes, the recently completed US 281/IH-410 directional ramps, and the Walters Road interchange improvements on IH-35. Other BRAC-supporting critical projects – such as the elevated managed lanes on IH-35 from IH-37 to Loop 1604 north have been studied, but not programmed for final design, funding and construction. Ongoing evaluation of freeway system performance and traffic congestion mitigation measures should continue to be pursued aggressively as BRAC related expansion increases traffic loads from Fort Sam Houston and intensified development of areas surrounding the post.



Location of Redevelopment Parcels around Fort Sam Houston

Yellow Text Boxes: Fort Sam Houston and BAMC Triangle
 Green Text Boxes: Short-term Growth Areas (10 year)
 White Text Boxes: Long-term Growth Areas (beyond 10 years)

5.2 SHORT TERM IMPROVEMENTS

A majority of the roadway network improvements that can be implemented on a short-term basis have been identified by previous traffic circulation studies prepared for the expansion of Fort Sam Houston and Brooke Army Medical Center. The major constraint to most of these improvements has been funding, and efforts are underway to acquire Federal earmark funds. Among the most important are widening projects for Walters Street from Wilson Street to IH-35, and improvements to the Harry Wurzbach Road corridor from Winans Road to Loop 368 (Austin Highway). The City of San Antonio is developing a new north-south roadway west of the AT&T coliseum and east of the railroad tracks from IH-35 frontage roads to East Houston Street. The regional transit agency (VIA) is also investigating transit and vanpool strategies that can be applied immediately with little or no funding commitment.

What is needed on an immediate basis is a plan and supporting strategies that ensure that ongoing improvements will move toward a common goal. Such a plan would ensure that redevelopment initiatives include transportation network improvements and right-of-way preservation to accommodate expected full-build-out of the economic development program proposed in the GMP. Otherwise, short-term improvements should focus on relief routes that will provide alternative points of access to the post while other entry ways are under construction, and provide new capacity for the upcoming increase in post activity. Recommendations are listed below:

- Complete the western extension of Petroleum Drive from Holbrook Road to intersect with both Nursery Road and Williams Road inside Fort Sam Houston, and provide adequate access control point (ACP) processing capacity to divert traffic from other gates, and to make more effective use of the Petroleum Drive and Holbrook Road corridors. This corridor should be in place prior to the start of bridge construction on Binz Engleman Road at Salado Creek. A new bridge over Salado Creek for Petroleum Drive has already been funded.
- Extend Holbrook Road south of Petroleum Drive to connect with the 26th Street segment that extends south to Binz Engleman Road.
- Extend Coliseum Road north from IH-35, across the railroad tracks to connect with the corner where Williams Road and Wilson Street meet inside Fort Sam Houston, and provide an ACP for post entry. Consider relocation of the commercial vehicle entry from Jadwin Road to this new ACP to eliminate redundancy, and take advantage of more direct access for trucks from IH-35 frontage roads using the Coliseum Road underpass. This project should be completed prior to start of reconstruction on the Walters/Scott corridor between IH-35 interchange and Henry T. Allen Road so that it can serve as a relief route.
- Extend George C. Beech Avenue east of its IH-35 interchange as a four lane divided roadway to intersect with Binz Engleman Road to improve access to parcels that could accommodate medical-oriented commercial development that supports the BAMC mission.

- Reconstruct the existing segment of Binz Engleman Road from IH-35 to IH-410 to a four lane undivided section to support additional development east of the BAMC Triangle.

5.3 MID TERM IMPROVEMENTS

Mid-term improvements over a five to ten year timeframe should focus on intersection/interchange improvements, bottleneck removal, and expansion to corridors that can readily accommodate widened due to available right of way.

Recommendations include:

- Implement emergency widening of IH-35 from the LP 410 south junction to LP 1604. This widening consists of restriping the existing six lane freeway to eight lanes with reduced shoulders from the IH-410 west directional ramps to the IH-410 south directional ramps, and restriping the existing eight lane freeway to ten lanes from the IH-410 west directional ramps to the SH 218 ramps, and from six to eight lanes from the SH 218 ramps to the LP 1604 collector-distributor road ramps. Such a change will require a safety evaluation including incident management strategies to obtain permission from the Federal Highway Administration. However, IH-35 is a crucial transportation linkage with critical importance to the mission of Fort Sam Houston. Improvement to IH-35 operations should receive the highest priority.
- Widen Harry Wurzbach Road from four to six lanes from the Winans Road intersection to the shopping center intersection just south of the LP 368 overpass. Expand the Rittiman Road approaches to Harry Wurzbach Road to include full length turn bays as recommended in previous studies.
- Add additional turn lanes to IH-35 interchange intersections at Walzem Road, Eisenhower Road and Rittiman Road to increase interchange capacity. Turn movement counts and a traffic concept study would need to be conducted to identify the most effective expansion and lane allocation strategy for these interchanges.
- Construct a new two-lane realignment of New Braunfels Avenue at Eleanor Avenue to connect with Pine Street at Brahan Blvd. This realignment would reconnect the now-broken New Braunfels Avenue alignment to Pine Street, which also has an IH-35 crossing, and establish a permanent western boundary for the Fort Sam Houston access control boundary. Post lands located west of this alignment would be released for other private sector uses, or military uses that do not require security control.

5.4 LONG TERM IMPROVEMENTS

Large scale transportation projects can not be implemented quickly due to the lack of funding, or the need for a time-consuming process that could include environmental clearance, design, right of way, utility relocation and construction activities. Long term improvements must ultimately address deficiencies in high-capacity regional routes including the freeway system. Due to the extensive effort required to design and construct these improvements (issues similar to ongoing expansion of IH-410 north), these projects can only be implemented on a long term time frame.

- Widen IH-35 from six lanes to ten lanes between the IH-410 south junction and the IH-410 west junction.
- Widen IH-35 from eight to twelve lanes between LP 1604 and the IH-410 west junction.
- Widen IH-35 from six to at least eight lanes beyond LP 1604. To be effective, this improvement should extend at least three minor interchanges north of Loop 1604.
- Widen IH-410 east loop to six lanes from IH-10 on the south to the split between the IH-410/IH-35 ramp legs south of FM 78.
- Implement improvements to upgrade FM 78 to an access controlled expressway from IH-410 to Randolph Air Force Base (and potentially beyond). Expressways include control of access from high volume driveways, interchanges at high-volume crossroads that would otherwise produce intersection congestion, and signalized intersections with lower volume feeder roads.
- Complete a four lane divided connection between the western end of FM 78 at IH-410 and the north end of Currency Street. Expand Currency Street/Creekview Drive from north of Profit Street to Gember Road to a four lane roadway with a two-way left turn lane.
- Develop a new east-west four lane divided arterial street north of Sherman Street in the soon-to-be-abandoned rail yard area south of IH-35. The new roadway should pass under existing roadway crossings at New Braunfels Avenue and Walters Street, and extend from Broadway Street on the west to Coliseum Road on the east, perhaps using the existing Anoil Street industrial cul-de-sac, which extends west of Coliseum Road just south of Gembler Road. Lateral (north-south) roads should be constructed to connect this arterial to the surrounding street grid. Frank Street would be particularly useful since it can be extended north of IH-35 through an existing unused IH-35 underpass.
- Extend Creekview Drive south of Gembler Road to join East Commerce Street adjacent to IH-10 as a four lane divided roadway.

6.0 ROADWAY IMPROVEMENTS FOR NEAR TERM REDEVELOPMENT

The following sections describe the traffic impacts of redevelopment proposed for specific parcels of land that have been identified for near term redevelopment over the next ten years. For each parcel the gross number of weekday vehicle trips has been estimated based on the land uses proposed. This near term development plan generates a total of 300,000 gross vehicle trips per day. Of these, only 40,000 are related to residential uses with another 10,000 by transient residential uses (hotels or motels). These road improvements only involve segments required to distribute traffic generated by the parcel to the nearest major streets and highways. The location of each parcel and the associated daily trip generation was illustrated on a previous figure on page 8.

Parcel W-3/FSH-W-1 – Cunningham Avenue and Broadway Street

Redevelopment of this 37 acre parcel is expected to generate 20,700 trips per day. Due to the lack of street network connectivity, all of these trips would need to load onto

Broadway Street. To help improve street network connectivity to better distribute these trips, the following road improvements are recommended:

- Extend Pine Street north of Nika Street to intersect Mulberry Street
- Extend Austin Street north of Josephine Street to intersect Cunningham Street

Parcel SW-2 – Lamar Street east of IH-37

Redevelopment of this 20 acre parcel is expected to generate 12,000 trips per day. Though the connectivity of the surrounding street grid is affected by the IH-37 and the rail road tracks, existing traffic volumes are so low that the total site traffic could be easily absorbed. Austin Street extends north and south to provide access to multiple east-west streets that are not blocked by the railroad tracks and/or IH-37, including a crossing under IH-35.

Parcel S-3 – North of Sherman Street between Pine Street and New Braunfels Avenue

This 56 acre parcel is currently occupied by a rail yard, and redevelopment is expected to generate 24,900 trips per day. The traffic generation is rather large given that surrounding streets are all minor residential streets. However, the recommended new four lane divided arterial north of Sherman Street provides a new arterial street to accommodate site generated traffic. Recommended other improvements include:

- Widen Duval Street as a two lane, two way collector street with a two-way left turn lane between Austin Street and Benton Street.
- Widen Pine Street to a four lane roadway from IH-35 to Sherman Street
- Construct a grid of streets on the site that matches up with adjacent street grid segments north and south of the site. At least one street should cross the remaining railroad tracks at the north end of the site (such as Palmetto Avenue)

Parcel SE-3 – Walters Street and Gabriel Street

This 20 acre parcel is intended for community service uses that are expected to generate 3,300 trips per day. Major road capacity and connectivity improvements are not needed to absorb the traffic, but changes in intersection control may be needed to establish a preferred route for traffic entering the site from the adjacent residential street grid. The only recommendation is to coordinate site plan development with a traffic circulation study of local streets that would connect site generated traffic to New Braunfels Avenue and Walters Street. This site could also be accessed from the recommended east-west arterial street north of Sherman Street.

Parcel SE-2 – Houston Street and Coliseum Road

This 210 acre parcel currently contains a large beverage manufacturing plant. An intense commercial mixed-use entertainment-retail district is expected to generate 105,600 trips per day. Such a development would distribute sizeable amounts of traffic to surrounding streets including Coliseum Road, Houston Street and Commerce Street, and would also require regional access via IH-35, IH-37, US 281, IH-410 and IH-10. Though a portion of trips from this site would be absorbed by interaction with the Coliseum events and surrounding neighborhoods, major widening to Commerce Street and Houston Street would be needed. These streets are currently four lane undivided roads over most of their lengths between IH-37 and IH-10.

- Expand Houston Street to six lanes from the railroad tracks to Commerce Street, and eight lanes from Commerce Street to the IH-10 interchange. Expand approaches to the IH-10 interchange to logically allocate this lane capacity and increase capacity of turn movements between IH-10 east and Houston Street on the west.
- Extend Commerce Street north of Houston Street as at four-lane divided roadway to connect with Currency Street.
- Implement access management improvements to segments of Commerce Street and Houston Street from IH-37 to the rail road tracks just west of the parcel to mitigate increases in traffic within the existing capacity of these road segments.

Parcel SC-1 – Walters Street and Hood Street

This six acre parcel is to be used for neighborhood retail uses that would generate 7,000 trips per day. Much of the demand for these uses is expected to be generated from walk-in or drive-in patrons from Fort Sam Houston and the surrounding neighborhood. Thus, road improvement beyond the planned upgrade to Walters Street (from a four lane undivided to a six lane divided arterial) are not needed.

Parcel NE-1 – Rittiman Road and Holbrook Road

This 7.5 acre parcel is most suitable for neighborhood retail use expected to generate 3,500 trips per day. Though no new roads are needed for such a small parcel, safe and efficient access to Rittiman Road may require that Rittiman Road be widened to include left turn lanes to reach the parcel.

- Widen Rittiman Road east of the Salado Creek Bridge to include a two-way left turn lane up to the segment with an existing two-way left turn lane west of IH-35 at Rittiman Plaza Drive.

Parcel NE-2 – IH-35 at Petroleum Drive

This 106 acre parcel is situated adjacent to a post access control point. A mixed-use development is recommended for this area. Though this area would be suitable as a residential enclave with access to Fort Sam Houston and BAMC Triangle, site access for commercial or other uses is incomplete and awkward. The expected traffic generation of 49,800 trips per day would thus require major improvements to Holbrook Road, Petroleum Drive, the IH-35 frontage roads, and improvements to adjacent interchanges on IH-35 at Rittiman Road and George C. Beach Avenue. Site development would benefit from the previously discussed western extension of Petroleum Drive, and the southern extension of Holbrook Road to connect with 26th Street, which connects to Binz Engleman Road. However, these additional improvements would also be needed:

- Expand the southbound IH-35 frontage road from two to three lanes from Rittiman Road to Binz Engleman Road.
- Add a u-turn bridge over IH-35 at George C. Beach Avenue for the southbound to northbound frontage road movement.
- Improve the northbound IH-35 entrance ramp from George C. Beach Avenue to a two lane on ramp. This improvement involves numerous operational complications affecting the downstream IH-410 merge area on IH-35.

- Expand Petroleum Drive to four lanes to accommodate site generated traffic from IH-35 southbound frontage road to west of Holbrook Road.
- Consider condemning industrial parcels to the north of the site so that Rittiman Plaza Drive can be extended south to connect the parcel with Rittiman Road.
- Additional improvements to the Rittiman Road interchange and arterial roadway adjacent to IH-35 are also necessary, possibly including expansion to six lanes over a limited distance.

Parcel E-1 – North of FM 78 between IH-35 and IH-410

This 115 acre parcel currently is half developed with industrial uses, but could be redeveloped to commercial medical uses expected to generate 18,700 trips per day. Other than improvements listed below, the surrounding loop of one way frontage roads and freeway ramps along IH-35 and IH-410 otherwise provide full access to freeways for all movements.

- Access to the parcel would be improved by extending George C. Beach Avenue east and south to intersect with Binz Engleman Road, as previously recommended for mid term improvements.
- An additional two-lane east-west collector is recommended in the same alignment as Petroleum Drive to help improve internal circulation within the triangle between the northbound IH-35 frontage road and the southbound IH-410 frontage road.

Parcel E-2 – South of FM 78 and East of IH-410

This 82 acre parcel currently contains limited industrial development. If redeveloped to commercial medical uses, the parcel is expected to generate 13,400 trips per day. The parcel is almost completely dependent on FM 78 for access to surrounding streets and freeways.

- Add a u-turn ramp south of FM 78 to connect the IH-410 northbound to southbound frontage road.
- Conduct a traffic circulation evaluation to identify intersection improvements necessary to distribute traffic from this parcel among the intersections along FM 78 from IH-410 near IH-35 on the west to Old Seguin Road on the east.

Parcel E-3 – South of FM 78 at IH-410

This 54 acre parcel is currently half developed with industrial uses, but could be redeveloped to commercial medical uses expected to generate 8,800 trips per day. Though access to the site appears awkward, the surrounding loop of one-way freeway frontage roads, FM 78 and adjacent freeway ramps do provide full access to surrounding streets and freeways.

Parcel E-4 – South of IH-410 South Spur at FM 78

This 60 acre parcel is isolated and undeveloped. Commercial medical uses designated for the site would generate 9,800 trips per day. The site would be viable for commercial development if street network connectivity were improved. The surrounding configuration of railroad tracks and freeway ramps makes this site difficult to get to. Recommended improvements include the aforementioned extension of FM 78 west of

IH-410 to connect with Creekview Drive on the south, and another connection to the northwest with IH-35 frontage roads at the Salado Creek Bridge. Also included is widening of Creekview Drive to four lanes for another mile to the south to Gemblar Road. These improvements were part of the regional mid-term plan. Otherwise, on-site collector streets are needed to provide access to individual parcels.

Parcel E-5 – Creekview Drive at Salado Junction

This 61 acre parcel is partially developed and has accessibility from the south. Commercial medical development on the site would generate 13,200 trip per day. Like parcel E-4, street network connectivity needs to improve, including the western extension of FM 78, and a connection from Creekview Drive to IH-35 frontage roads using the Salado Creek crossover. An internal network of two lane collector streets would be needed among both parcels E-4 and E-5 to delineate individual parcels for development and provide necessary accessibility.

Parcel E-6 – Binz Engleman Road and Nursery Road in Fort Sam Houston

This 20 acre parcel is located within Fort Sam Houston along Salado Creek. Residential use of the property would generate 2,900 trips per day. Since residents of this site are likely to be Fort Sam Houston employees, most of this traffic is likely to be absorbed by the internal post circulation system. Development of a collector street extending Holbrook Road south of Petroleum Drive to Binz Engleman Road would improve connectivity and circulation for this and other parcels in the area.

Parcel E-7 – Between Seguin Road and IH-35

This 25 acre parcel is developed with a mixture of industrial and transient residential (motel) uses. Redevelopment is expected to convert the remaining industrial to transient residential uses generating 2,000 trips per day. Some of this would be offset by the loss of trips from former industrial developments. Despite the rather awkward road network serving the area, it is possible to reach the area from either direction of IH-35 and from IH-410 south. The biggest constraint to growth would be the capacity of the IH-35/Binz Engleman Road interchange. Some capacity expansion is already planned for this interchange, but future reconstruction of the IH-35 overpass, and installation of a third traffic signal for Seguin Road and Binz Engleman Road are longer term needs.

Parcel E-8 – Binz Engleman Road at Salado Creek

This 55 acre parcel had mostly industrial uses closer to IH-35, but recently, two apartment complexes had been built on parcels closer to Salado Creek. Redevelopment as a mixed-use residential area is expected to generate 19,100 trips per day. This site is situated south of the BAMC triangle, but is bounded by Salado Creek. The recent construction of two apartment complexes on vacant industrial parcels was unexpected in such an area that is isolated from other services. However, this may be evidence of demand for local rental housing generated by BAMC and Fort Sam Houston. Though road improvements are not absolutely necessary for this site, it would be beneficial to establish a road along Salado Creek that connects Binz Engleman Road with IH-35 at the IH-35/Salado Creek bridge. This bridge also serves as a turn around between the northbound and southbound IH-35 frontage roads, as well as a connection for the south end of Seguin Road. The recommended road along

Salado Creek would complete a circulation loop around the entire parcel and provide connectivity to parcel E-7 located between Seguin Road and IH-35.

7.0 SUPPORTING IMPLEMENTATION

The following are recommended future study efforts to support the ongoing evolution of both Fort Sam Houston and redevelopment of surrounding areas.

Fort Sam Houston Revitalization Traffic Circulation Study

This study is a logical extension of the preliminary work conducted for this Task 3 report, and includes more extensive traffic circulation analysis and site traffic impact analysis to help guide ongoing development of the areas surrounding Fort Sam Houston. This study should consist of the development of a traffic simulation model to evaluate ongoing development and road improvement needs, followed by a retainer to conduct ongoing studies as development and road project occur. As part of a growth management plan, this study effort would provide ongoing support in the areas of transportation planning, traffic engineering, and urban street design.

BAMC Medical Core Traffic Circulation Study

The purpose of this study is to evaluate the development capacity of the industrial and isolated land parcels around the BAMC campus for potential redevelopment into uses that support the BAMC mission. It is presumed that a mixture of medical oriented commercial and industrial uses will begin to occur in this area, and there are opportunities for supporting higher-density residential uses as well. However, the surrounding road network is broken by large industrial parcels and the intersecting network of rail road tracks and freeways. The goal is to develop a subarea plan that would identify roadway network connectivity improvements, and a rational land use plan that limits zoning to match up with an affordable roadway improvement plan.